

ABSTRACT OF THE DISCLOSURE

A method and apparatus for predicting a plurality of surface multiples for a plurality of traces in a record of seismic data. The method includes (a) selecting a target subsurface line; (b) selecting an input subsurface line within an aperture of the target subsurface line; (c) selecting a point on a line twice the distance between the input subsurface line and the target subsurface line, wherein the point corresponds to a potential downward reflection point of the surface multiples for a trace in the record; (d) generating a potential surface multiple for the trace corresponding to the point; (e) repeating steps (c) through (d) for each point on the line to generate an inline of potential surface multiples for the trace corresponding to each point on the line; (f) repeating steps (b) through (e) for each input subsurface line within the aperture of the target subsurface line to generate a plurality of potential surface multiples for the trace corresponding to each input subsurface line within the aperture; and (g) adding the plurality of potential surface multiples corresponding to each input subsurface line within the aperture to generate a surface multiple for the trace.